PROTECTION AGENCY
APR 2 2 1996
MONTANA OFFICE
1069082 - R8 SDMS

ASARCO

April 22, 1996

John F. Wardell
Director, Montana Office
United States Environmental Protection Agency
301 S. Park, Drawer 10096
Helena, Montana 69626-0096

RE: Asarco's Response to March 15 1996 Section 3007 Information Request

Dear Mr. Wardell:

This letter, with its attachments, responds to the March 15, 1996 RCRA Information Request sent to Asarco with reference to certain matters at its East Helena plant.

1. Identify the materials that are spent carbon in the Table submitted in Asarco's December 5, 1995 response.

There are no "spent carbons" in the Table submitted in the December 5 Response. The "spent carbons" from which the East Helena plant recovers precious metals are virgin feedstocks of mining companies, not secondary materials, and for that reason they were not included in the Table. The reference to "spent carbons" in the December 5 Response as part of the category "Silver/Gold Fines" was in error.

In its June 7, 1995 Response to an information request from the State of Montana, Asarco explained that the principal technology for recovering gold from cyanide solutions is called the Carbon-in-Pulp process. In this process, gold-containing solutions resulting from the leaching of mined ores are passed through filters loaded with activated carbon. The carbon absorbs the gold from the solutions. The gold can then be "stripped" from the gold-bearing filters or "carbons" chemically or by extracting it pyrometallurgically in a smelter. Many small miners lack the facilities for stripping their gold-bearing carbons or find that they cannot strip all of the gold from the carbons. To recover the gold, they send the carbons to the East Helena

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plant for processing. The loaded carbons are like the concentrates that are produced in other types of mining operations and sent to the East Helena plant for metal recovery. For that reason, they are listed in Attachment 5 with the other virgin ore feedstocks sent to the East Helena plant.

Although commonly referred to in the mining industry as "spent", the carbons are not "spent" as that term is defined under RCRA. 40 CFR § 261.1(c)(1). They are not materials that have "been used and as a result of contamination can no longer serve the purpose for which [they were] produced without processing." Rather, the carbons are materials that have been purposefully loaded with metals and that will not have served the purpose for which they were produced until the metals are recovered from them in the smelting process.

2. Provide the chemical composition, assays and sources of all commercial fluxes used at the East Helena plant.

Attachment 1 contains a listing of the chemical assays and sources of all commercial fluxes recently used at the East Helena plant. Four of the fluxes were purchased for their high silica content. One of the fluxes was purchased for its high lime content. Three of the silica-containing fluxes are ores that also have a significant metal content. Asarco classifies them as commercial fluxes, rather than virgin ore feedstocks, because they have a silica content of approximately 60% or higher. This is an arbitrary distinction that does not accurately reflect the role that ores with high silica-content play in the smelting process. Please note that in Attachment 6, which lists the virgin ore feedstocks used at the East Helena plant, there are a number of ores that also have a significant silica content. The silica in these ores acts as a flux in the smelting process just like the silica in the commercial fluxes. However, because the silica content of the ores is less than 60%, Asarco classifies them as virgin ore feedstocks, rather than commercial fluxes.

3. Provide records documenting when commercial flux was replaced with substitute fluxes for the following calendar years: 1992, 1993, 1994 and 1995. These records should document the quantities and sources of flux substitute used and how much commercial flux was held back or how mixtures of

flux are used. Describe how the flux substitute to commercial flux ratio is determined.

See Attachment 2 for a listing of how much commercial and substitute flux was used by the plant from 1992 through 1995. There is no ratio or mixture that must be maintained between the amount of commercial and the amount of substitute flux that is used in the smelting process. The key consideration is whether the right amount of silica (or other fluxing agents) is in the blast furnace charge, not whether the silica is derived from a commercial or a substitute flux or, for that matter, from silica-containing virgin ore feedstocks. The right amount of silica produces an optimal slag that captures the unwanted constituents, referred to as gangue, from the materials from which metal is being recovered. The plant adds as much silica to the charge as is necessary from its available stocks to insure that metal recovery during the smelting process will be maximized. To determine whether enough silica has been added, the plant monitors the amount of silica present in the slag exiting the process. Samples are taken three times a day. The amount of silica present in the slag is a reliable indicator whether enough silica has been added during the smelting process. Attachment 2 contains formulas for determining the amount of silica and lime to be added to the blast furnace charge.

4. Provide assays, physical descriptions and the types (i.e. manner in which they are produced and/or sources) of flux substitutes received from Encycle's Corpus Christi, Texas plant.

In the years 1992 through 1995, the East Helena plant received seven different flux substitutes from Encycle. All Asarco assay information on these materials was provided to EPA in the table attached to Asarco's December 5, 1995 Response to EPA's September 12, 1995 Information Request. The only information that Asarco has about the "physical descriptions and types (i.e. manner in which they are produced and/or sources) of flux substitutes" is found in the contracts. In the same order as they are listed in the December 5 response, the contracts describe the materials as follows: "crushed T.V./CRT tubes"; "broken T.V./CRT tubes owned or controlled by Encycle"; "broken T.V./CRT tubes ex. Lead Recycling"; "silica sand owned or controlled by Encycle/Texas"; "silica sand produced by Encycle/Texas";

"silica sand ex. Robbins Air Force Base"; and "iron hydroxide owned or controlled by Encycle".

5. Provide a mass balance summary, with supporting records, of the ultimate disposition and intermediate steps of arsenic and cadmium in the flux substitutes used at the East Helena plant.

Asarco does not have mass balance summaries for the arsenic and cadmium in the flux substitutes used at the East Helena plant. Even if all necessary assay information were available, it would be virtually impossible to do a mass balance summary showing where and in what amounts the arsenic and cadmium present in the flux exit the smelting process. As a custom smelter, the East Helena plant processes hundreds of different types of materials. Typically, a variety of materials will be mixed in any given blast furnace charge. Most of the materials will contain some arsenic and cadmium. Thus, tracking the arsenic and cadmium attributable to the flux substitute through the smelting process to the point of exit is not feasible.

6. Provide an arsenic mass balance summary with supporting documentation for the East Helena plant for the years 1992, 1993, 1994 and 1995. Include a description of the ultimate disposition and intermediate steps in the mass balance. If arsenic is shipped off site in any form, identify the shipping destination and amount shipped.

The East Helena plant prepares metal balance summaries on a semi-annual basis for arsenic and some other metals. The summaries are prepared for inventory purposes. The metal balance summaries for arsenic for 1992 through 1995 are found in Attachment 3. The summaries show the inputs (i.e, all arsenic in the materials introduced into the smelting process for which assay information is available), off-site shipments and metal loss. Metal loss is a composite figure that shows the amount lost to slag, the amount lost in air emissions or other releases, and the amount that cannot be accounted for due to analytical, weighing and sampling errors that are inherent in the mass balance methodologies employed by the plant.

7. Provide the following information for arsenical speiss:

a. The quantity of arsenical speiss generated in 1995.

9142 tons.

b. Records documenting the amount of arsenical speiss (generated at East Helena) sent to Asarco's other facilities for the years 1992, 1993, 1994 and 1995. Include a description of how much speiss went to each facility.

Year	Speiss Produced (tons)	Speiss to Ray (Hayden) (tons)	Speiss to El Paso (tons)
1992	8,162	4,922	2,678
1993	9,586	6,950	2,432
1994	9,663	10,005	(1)
1995	9,142	7,911	1,196

The records documenting these facts are found in Attachment 4. Annual variation between speiss production and speiss shipment results from the speiss produced in a given year not being shipped that same year.

c. A comparison of the arsenical speiss generated at East Helena and the arsenic species normally found in electrolyte used by Asarco's copper smelter. Include assays of the arsenical speiss and the electrolyte.

The arsenical speiss generated at Asarco's East Helena plant contains arsenic in the form of copper arsenide (-3 oxidation state). The arsenic species found in the electrolyte used by Asarco's copper refinery is principally arsenate (+5 oxidation state), while the remainder is arsenite (+3 oxidation state). There is no electrolyte used in Asarco's copper smelters.

The weighted average assay of East Helena speiss for 1995 is as follows:

Gold	1.9 oz/ton
Silver	340 oz/ton
Lead	19 %
Copper	40 %

Arsenic	7.2 %
Antimony	4.5 %
Tin	0.94 %
Nickel	0.74 %
Iron	2.0 %
Zinc	0.74 %

The concentrations of the most important constituents in an acceptable electrolyte will fall within the following ranges:

Copper	42-48 g/l
Nickel	20 g/l
Arsenic	5 g/l
Antimony	0.4-0.7 g/l
Bismuth	0.1-0.3 g/l

A brief explanation of how the arsenic speiss is used may be helpful. Speiss from Asarco's East Helena plant is shipped to Asarco's copper smelters for two purposes: 1) to recover the arsenic from the speiss for use in supplying the arsenic essential to the electro-refining of copper; and 2) to recover the copper, lead, gold, silver, nickel, antimony and bismuth in the speiss.

The arsenic speiss is introduced at the smelters at various points in the smelting process. The arsenic from the speiss that reports to the impure copper remains in the -3 oxidation state. The impure copper is then cast into anodes and sent to the Amarillo copper refinery.

At the refinery, impurities such as bismuth and antimony must be removed from the copper. As part of the electro-refining process, the arsenic present in the copper anodes is dissolved in the electrolyte, along with bismuth and antimony. The bulk of the arsenic (90%+) is oxidized to the +5 oxidation state (arsenate) and the remainder is present in the +3 oxidation state (arsenite). The arsenate reacts with the dissolved antimony and bismuth and precipitates antimony arsenate and bismuth arsenate, thus separating most of the arsenic, antimony and bismuth from the refined copper product and the electrolyte. Removal of the bismuth and antimony is the primary function of the arsenic in the refining process. The bismuth and antimony must be removed for the copper product to meet customer specifications.

d. Describe procedures to determine metals content in the electrolyte. Provide a representative sample of operating logs which illustrate how the chemical composition of the electrolyte is maintained by placing arsenical speiss into it.

To keep the refined copper product within customer specifications, the concentration of arsenic and various metals in the electrolyte must be maintained within certain minimum/maximum tolerances. The current acceptable concentrations for the most important constituents of the electrolyte are as follows:

Copper	42-48 g/l
Nickel	20 g/l
Arsenic	5 g/l
Antimony	0.4-0.7 g/l
Bismuth	0.1-0.3 g/l

These constituents, including arsenic, are monitored on a daily basis by atomic absorption. If any constituent falls outside the acceptable range, action is taken to correct the deviation. Asarco has records of its monitoring results, but does not keep operating logs of the type requested. In the absence of the arsenic recovered from the arsenic speiss provided by the East Helena plant, Asarco would have to purchase arsenic trioxide or some other similar arsenic compound to maintain a level of 5 g/l in the electrolyte.

8. Provide a mass balance summary for blast furnace cadmium dust for the following years: 1992, 1993, 1994 and 1995. Include a description of ultimate disposition and intermediate steps in the mass balance. Identify the destinations and amounts of cadmium dust shipped off site. This information should include assays of the high cadmium dust.

Baghouse furnace dust is produced by filtering both the process and the ventilation gases that originate at the blast furnace and dross plant operations. When the concentration of the cadmium in the dust reaches approximately 17%, it is currently sent to Encycle in Corpus Christi, Texas for recovery of the zinc and cadmium. Asarco has provided a description of the recovery process in the two letters that it sent to the State of Montana on October 20, 1995 in response to State Information Requests. The processing of

dust produces, among other things, a lead sulfate filter cake that is returned to East Helena for recovery of the lead. Attachment 5 shows the amounts, assays and destinations of cadmium dust shipped off-site for the years 1992 through 1995. It also shows the amount of metals returned to Asarco in the lead sulfate filter cake.

9. Spent furnace brick is considered to be a spent material and usually fails the TCLP test for metals. Therefore, spent furnace brick would be considered a hazardous waste even if recycled. Explain the rationale for Asarco's decision to smelt spent furnace brick. Provide the 40 CFR Part 266.112(b) required comparison of waste-derived residue with normal residue, or explain why this regulation does not apply or why the comparison was not done.

Asarco responded to this request in a letter to Mr. Wardell dated March 27, 1996. Asarco has since received a response to its letter dated April 15 that requests additional information about its management of brick. Asarco will provide the requested information shortly.

10. Provide the metallurgical profiles, sources and amounts of virgin ore feedstocks accepted at Asarco's East Helena plant for smelting.

See Attachment 6. Please note, as explained above in answer to Request No. 2, that some of the feedstocks contain significant amounts of silica and thus serve a dual purpose in the smelting process--i.e., as a source of metals and as a source of silica, which acts as a fluxing agent.

11. Provide the mineral concentrations in the ore cutoff grade.

The East Helena plant is a primary lead smelter. Ore cutoff grades are calculated and used by mines, not smelters, and they are not typically shared with the smelters that purchase concentrates from the mines. As a result, the East Helena plant does not have any information on the ore cutoff grades that may be used by its dozens of suppliers, nor is there an ore cutoff grade established for the smelter.

12. Provide the metallurgical profile (including concentrations of all metals) of the normal operating range criteria for the blast furnace.

The desired metallurgical profile for the feed to East Helena's blast furnace is found in Attachment 7. The profile shows the feed compositions necessary for the smooth operation of the blast furnace. At the East Helena smelter, which processes hundreds of different types of materials, a variety of materials can often be found in any given charge to the blast furnace. The blast furnace operating conditions cannot therefore be used to determine whether metal can be efficiently recovered from any particular material. Whether metal can be efficiently recovered from a particular material is determined by the composite metal content of all of the materials that may be mixed with it in the charge, not by whether its own metal content falls within the desired metallurgical profile.

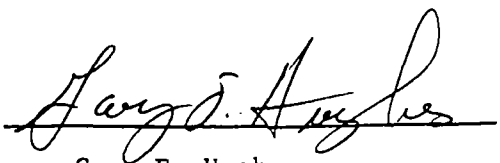
Sincerely,

(for) J. R. Shaw
Unit Manager

cc: Robert Comer
Jon Nickel
Richard Marcus

C E R T I F I C A T I O N S T A T E M E N T

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: 

Print Name: Gary F. Hughes

Title : Acting Plant Manager

Date : April 22, 1996

CHEMICAL ASSAYS AND SOURCES OF COMMERCIAL FLUXES

ATTACHMENT 1

ASARCO INC. EAST HELENA PLANT
CHEMICAL ASSAYS OF COMMERCIAL FLUXES

SOURCE	CHEMICAL ASSAY											
	O/T Au	O/T Ag	%Pb	%Cu	%SiO2	%Fe	%CaO	%Zn	%S	%As	%Sb	%Bi
Helena Sand & Gravel					61.4							
Fairfield Mine	2.53	3.45	0.41	0.28	70.00	6.57				0.11	0.07	0.02
Black Pine Mine	0.04	11.44	1.11	0.35	83.20	3.14	0.33	0.11	0.44	0.21	0.30	0.03
Diversified Mine	1.28	1.39	0.23	0.10	78.80	6.55		0.10		0.10	0.09	0.03
Asarco Owned Limerock Quarry					2.80	0.80	52.00					

O/T = ounces per ton

SUMMARY TABLE OF COMMERCIAL AND SUBSTITUTE FLUXES

ATTACHMENT 2

ASARCO INC. EAST HELENA PLANT
COMMERCIAL AND SUBSTITUTE FLUXES
FROM YEARS 1992 THROUGH 1995

	1992		1993		1994		1995	
	RECEIPTS TONS	SMELT TONS	RECEIPTS TONS	SMELT TONS	RECEIPTS TONS	SMELT TONS	RECEIPTS TONS	SMELT TONS
COMMERCIAL FLUXES								
HELENA SAND & GRAVEL	4,063	3,236	1,063	1,189 *				
FAIRFIELD MINE			2,199	793	9,360	3,708	1,983	8,508
BLACK PINE MINE	7,404	4,986	5,325	5,423	1,433	4,034		
DIVERSIFIED MINE			320		1,202	776	1,286	1,270
ASARCO LIMEROCK	30,197	30,197	29,041	29,041	41,897	40,052	41,332	39,071
SUBSTITUTE FLUXES								
LANTZ LENSES			140	140	89	82		7
X-CEL OPTICAL	129	109	109	129	105	99		
ENCYCLE/TEXAS					174	165	25	33
GOLDEN PHOTON			15			15	11	11
AASTRA ADVANCES CERAMICS	100	121		33			37	
X-CEL OPTICAL							101	101
ENCYCLE/TEXAS							2,504	1,891
ENCYCLE/TEXAS							1,254	433
ENCYCLE/TEXAS					978	923		
ENCYCLE/TEXAS					115	115	1,341	1,287
LANTZ LENSES			42	42				
ENCYCLE/TEXAS			24	24				
ENCYCLE/TEXAS	106	106					20	20
SOLAR CELLS					4	4		
ECS REFINING			34	34	82	81	97	96
NELS AND ALLEN NYGREN			10	5	9	5		9
FRANK WATKINS			16	8	20	28		
Total tons	41,999	38,755	38,338	36,861	55,468	50,087	49,991	52,737

* Sand is also used for road sanding, berms, and fill.

ASARCO INC. EAST HELENA PLANT
DETERMINATION OF FLUX CONTENT OF THE CHARGE

The silica content of the charge:

The amount of silica needed in the smelting process is calculated by the desired percentage of silica in the slag. The silica in the slag is equal to the total amount of silica in all materials processed, plus the commercial silica, plus the substitute silica.

Where as:

CF= Commercial Silica	(Tons * % Silica in the commercial flux)
SF= Substitute Silica	(Tons of each substitute flux * % Silica of each substitute flux)
SS= Slag Silica	(Tons of slag produced * % Silica in the desired slag)
SO= Silica in all other material processed	(Total tons of all materials smelted * % Silica in each ton of material smelted)

The net silica equation:

$$SS = SO+CF+SF$$

The lime content of the charge:

The amount of lime needed in the smelting process is calculated by the desired percentage of lime in the slag. The lime in the slag is equal to the total amount of lime in all materials processed, plus the commercial lime, plus the substitute lime.

Where as:

CL= Commercial Lime	(Tons * % Lime in the commercial flux)
SL = Substitute Lime	(Tons of each substitue flux * % Lime of each substitute flux)
SL= Slag Lime	(Tons of slag produced * % Lime in the desired slag)
LO= Lime in all other material processed	(Total tons of all materials smelted * % Lime in each ton of material smelted)

The net lime equation:

$$SL = LO+CL+SL$$

ARSENIC MASS BALANCE SUMMARY
INVENTORY METAL BALANCE SHEETS

ATTACHMENT 3

IMPURITY METAL BALANCE SHEET EAST HELENA PLANT 6 MONTHS ENDED JUNE 30, 19 92

ACCOUNT	ARSENIC POUNDS		
On hand first of period in Ores, Process, By-products, Shipping Products	2	350	324
Receipts in ore, matte, etc.	1	127	240
Transfers Received from (plant)			
AMARILLO		25	141
EL PASO		192	608
GLOBE		1	154
HAYDEN		156	348
OMAHA		2	195
Total to Account For	3	317	310
Less: On hand end of period in Ores, Process, By-Products, Shipping Products. SMELTED	2	017	273
	1	300	037

Production Marketable Products			
CHROMIUM DUST - EL PASO TO OMAHA			
Inter-plant Transfers Material to (plant)			
BULLION - OMAHA		72	097
SPEISS - EL PASO		304	387
SPEISS - HAYDEN		829	434
MATTE - EL PASO		51	702
CHROMIUM DUST - EL PASO TO GLOBE			105
Total Accounted For	1	257	725
Gain/(Loss) in Treatment	(1	542	312)
Per Cent Gain/(Loss)	(	30	13)

INSTRUCTIONS: This report should be forwarded to Comptroller as soon as the metal reports for the semi-annual period are completed. See Accounting Instructions 1-217 for detailed instructions.

Original to Comptroller / METAL ACCTG. SECT.

cc to DR RAMACHANDRAN Date 7/15/92 Correct G.A. Jones Approved

IMPURITY METAL BALANCE SHEET, REPORT NO. 217 EAST HELENA PLANT 6 MONTHS ENDED JUNE 30, 19 92

IMPURITY METAL BALANCE SHEET EAST HELENA PLANT 6 MONTHS ENDED DECEMBER 31, 19 92

ACCOUNT	ARSENIC POUNDS	
On hand first of period in Ores, Process, By-products, Shipping Products	2	017 273
Receipts in ore, matte, etc.		753 536
Transfers Received from (plant)		
AMARILLO		42 773
EL PASO		246 546
GLOBE		1 102
HAYDEN		61 404
OMAHA		7 306
Total to Account For	3	129 745
Less: On hand end of period in Ores, Process, By-Products, Shipping Products.	1	981 914
SMELTED	1	148 531

Production Marketable Products		
CADMIUM DUST - EL PASO TO JAPAN		
Inter-plant Transfers Material to (plant)		
BULLION - OMAHA		42 359
SPEISS - EL PASO		254 284
SPEISS - RAY		546 275
MATTE - EL PASO		38 357
Total Accounted For		912 270
Gain/(Loss) in Treatment		(236 261)
Per Cent Gain/(Loss)		(20 57)

INSTRUCTIONS: This report should be forwarded to Comptroller as soon as the metal reports for the semi-annual period are completed. See Accounting Instructions I-217 for detailed instructions.

Original to Comptroller / METAL ACCTG. SECT.

cc to DR. RAMACHANDRAN Date 1/12/93 Correct R. D. Eldredge Approved

IMPURITY METAL BALANCE SHEET, REPORT NO. 217 EAST HELENA PLANT 6 MONTHS ENDED DECEMBER 31, 19 92

IMPURITY METAL BALANCE SHEET EAST HELENA PLANT 6 MONTHS ENDING JUNE 30, 1993

ACCOUNT	ARSENIC POUNDS
On hand first of period in Ores, Process, By-products, Shipping Products	1,991,414
Receipts in ore, matte, etc.	830,926
Transfers Received from (plant)	
Amarillo	50,742
El Paso	284,477
Ray	103,264
Omaha	6,760
Globe	649
Total to Account For	3,266,232
Less: On hand end of period in Ores, Process, By-Products, Shipping Products	1,716,159
SMELTED	1,550,073

Production Marketable Products	
Cadmium Dust- El Paso to Japan	
Inter-plant Transfers	
Material to Plant	
Bullion Omaha	43,246
Speiss El Paso	241,478
Speiss Ray	464,576
Matte El Paso	50,338
Total Accounted For	799,638
Gain/(Loss) in Treatment	(750,435)
Per Cent Gain/(Loss)	(48.41%)

INSTRUCTIONS: This report should be forwarded to Comptroller as soon as the metal reports for the semi-annual period are completed. See Accounting Instructions I-217 for detailed instruction.

Original to Comptroller / Metal Actg.. Section
cc to Dr. Ramachandran

7/9/93 Correct R. D. Eldridge EAST HELENA PLANT

IMPURITY METAL BALANCE SHEET, REPORT NO. 217 6 MONTHS ENDING JUNE 30,1993.

IMPURITY METAL BALANCE SHEET EAST HELENA PLANT 6 MONTHS ENDING DECEMBER 31, 1993.

ACCOUNT	ARSENIC POUNDS
On hand first of period in Ores, Process, By-products, Shipping Products	1,716,159
Receipts in ore, matte, etc.	890,729
Transfers Received from (plant)	
Amarillo	67,101
El Paso	23,600
Ray	50,014
Omaha	4,770
Globe	0
Total to Account For	2,750,469
Loss: On hand end of period in Ores, Process, By-Products, Shipping Products	1,756,232
SMELTED	994,237

Production Marketable Products		
Inter-plant Transfers		
Material	to Plant	
Bullion	Omaha	121,427
Speiss	El Paso	100,006
Speiss	Ray	594,309
Matte	El Paso	(2,360)
Total Accounted For		813,462
Gain/(Loss) in Treatment		(180,775)
Per Cent Gain/(Loss)		(18.18%)

INSTRUCTIONS:

Original to Comptroller / Metal Actg., Section
cc to Dr. Ramachandran

as the metal reports for the semi-annual period are completed.
See Accounting Instructions I-217 for detailed instruction.

1/10/94 Correct R. Mahendra EAST HELENA PLANT

IMPURITY METAL BALANCE SHEET, REPORT NO. 217 6 MONTHS ENDING DECEMBER 31, 1993

IMPURITY METAL BALANCE SHEET EAST HELENA PLANT 6 MONTHS ENDING JUNE 30,1994.

ACCOUNT	ARSENIC POUNDS
On hand first of period in Ores, Process, By-products, Shipping Products	1,756,232
Receipts in ore, matte, etc.	718,033
Transfers Received from (plant)	
Amarillo	46,097
El Paso	36,112
Ray	70,779
Omaha	66,826
Globe	165
Total to Account For	2,694,243
Less: On hand end of period in Ores, Process, By-Products, Shipping Products	1,341,096
SMELTED	1,353,147

Production Marketable Products	
Inter-plant Transfers	
Material to Plant	
Bullion Omaha	193,604
Speiss El Paso	(51,759)
Speiss Ray	1,036,572
Matte El Paso	0
Total Accounted For	1,178,417
Gain/(Loss) in Treatment	(174,730)
Per Cent Gain/(Loss)	(12.91%)

INSTRUCTIONS: This report should be forwarded to Comptroller as soon as the metal reports for the semi-annual period are completed. See Accounting Instructions I-217 for detailed instruction.

Original to Comptroller / Metal Actg., Section
cc to Dr. Ramachandran 7/8/94 Correct_____ EAST HELENA PLANT
IMPURITY METAL BALANCE SHEET, REPORT NO. 217 6 MONTHS ENDING JUNE 30, 1994

IMPURITY METAL BALANCE SHEET EAST HELENA PLANT 6 MONTHS ENDING DECEMBER 31,1994.

ACCOUNT	ARSENIC POUNDS
On hand first of period in Ores, Process, By-products, Shipping Products	1,341,096
Receipts in ore, matte, etc.	670,504
Transfers Received from (plant)	
Amarillo	31,038
El Paso	64,540
Ray	56,359
Omaha	82,999
Globe	(90)
Total to Account For	2,246,454
Less: On hand end of period in Ores, Process, By-Products, Shipping Products	1,330,425
SMELTED	916,029
Production Marketable Products	
Bullion Cominco	2,300
Inter-plant Transfers	
Material to Plant	
Bullion Omaha	134,906
Speiss El Paso	0
Speiss Ray	658,755
Matte El Paso	0
Total Accounted For	796,041
Gain/(Loss) in Treatment	(119,988)
Per Cent Gain/(Loss)	(13.10%)

INSTRUCTIONS: This report should be forwarded to Comptroller as soon as the metal reports for the semi-annual period are completed. See Accounting Instructions I-217 for detailed instruction.

Original to Comptroller / Metal Actg., Section
cc to Dr. Ramachandran
IMPURITY METAL BALANCE SHEET, REPORT NO. 217

1/10/95 Correct R. Eldridge EAST HELENA PLANT
6 MONTHS ENDING DECEMBER 31,1994.

IMPURITY METAL BALANCE SHEET EAST HELENA PLANT 6 MONTHS ENDING JUNE 30,1995.

ACCOUNT	ARSENIC POUNDS
On hand first of period in Ores, Process, By-products, Shipping Products	1,330,425
Receipts in ore, matte, etc.	1,097,501
Transfers Received from (plant)	
Amarillo	11,300
El Paso	62,460
Ray	45,380
Omaha	59,218
Globe	0
Total to Account For	2,606,380
Less: On hand end of period in Ores, Process, By-Products, Shipping Products	1,852,175
SMELTED	754,205

Production Marketable Products		
Bullion	Cominco	2,735
Inter-plant Transfers		
Material	to Plant	
Bullion	Omaha	99,858
Speiss	El Paso	0
Speiss	Ray	555,832
Matte	El Paso	0
Total Accounted For		658,425
Gain/(Loss) in Treatment		(95,780)
Per Cent Gain/(Loss)		(12.70%)

INSTRUCTIONS: This report should be forwarded to Comptroller as soon as the metal reports for the semi-annual period are completed. See Accounting Instructions I-217 for detailed instruction.

Original to Comptroller / Metal Actg., Section
cc to Dr. Ramachandran
IMPURITY METAL BALANCE SHEET, REPORT NO. 217

7/7/95 Correct R. Ramachandran EAST HELENA PLANT
6 MONTHS ENDING JUNE 30,1995.

IMPURITY METAL BALANCE SHEET EAST HELENA PLANT 6 MONTHS ENDING DECEMBER 31,1995.

ACCOUNT	ARSENIC POUNDS
On hand first of period in Ores, Process, By-products, Shipping Products	1,852,175
Receipts in ore, matte, etc.	1,150,124
Transfers Received from (plant)	
Amarillo	16,630
El Paso	154,247
Ray	14,909
Omaha	(4,408)
Globe	0
Total to Account For	3,191,685
Less: On hand end of period in Ores, Process, By-Products, Shipping Products	2,011,349
SMELTED	1,180,336

Production Marketable Products		
Bullion	Cominco	0
Inter-plant Transfers		
Material	to Plant	
Bullion	Omaha	112,419
Speiss	El Paso	147,460
Speiss	Ray	614,062
Matte	El Paso	0
Total Accounted For		873,941
Gain/(Loss) in Treatment		(306,395)
Per Cent Gain/(Loss)		(25.96%)

INSTRUCTIONS: This report should be forwarded to Comptroller as soon as the metal reports for the semi-annual period are completed.
See Accounting Instructions I-217 for detailed instruction.

Original to Comptroller / Metal Actg., Section
cc to Dr. Ramachancran 1/9/96 Correct R. Glodge EAST HELENA PLANT
IMPURITY METAL BALANCE SHEET, REPORT NO. 217 6 MONTHS ENDING DECEMBER 31,1995.

ARSENICAL SPEISS SHIPMENTS

ATTACHMENT 4

ASARCO Incorporated
East Helena Plant
Speiss Shipments 1992 / 1995

Speiss Shipments 1995				Speiss Shipments 1994				Speiss Shipments 1993				Speiss Shipments 1992			
El Paso		Ray (Hayden)		El Paso		Ray (Hayden)		El Paso		Ray (Hayden)		El Paso		Ray (Hayden)	
Pounds	Tons	Pounds	Tons	Pounds	Tons	Pounds	Tons	Pounds	Tons	Pounds	Tons	Pounds	Tons	Pounds	Tons
(10,464)		3,046,145		(1,650)		1,088,009		6,628		1,179		(10,671)		(446)	
(9,516)		(25,397)				1,556,120		1,055,214		1,268		566,369		559,272	
174,303		352,697				(3,881)		165,968		1,592,685		565,756		690,109	
356,957		2,077,861				1,441,854		(3,220)		1,062,209		12,222		758,977	
(16,860)		(12,617)				1,264,505		4,087		(698,390)		366,303		10,858	
350,250		(8,191)				(25,129)		(22,837)		7,016		(415)		(189)	
861,860		1,259,752				2,025,126		(35,228)		3,900,797		(384)		(1,726)	
685,742		(21,143)				(75,486)		700,630		16,148		917,950		950,565	
		1,418,869				1,610,430		1,578,792		178,296		(1,146)		554,373	
		(3,714)				(8,621)		(16,108)		1,749,307		547,634		(5,756)	
		3,241				1,554,062		551,658		7,409		181,865		(5,512)	
		534,607				2,321,717		890,549		853,285		593		(7,005)	
		1,378,099				(2,928)		(11,985)		3,854		(29,436)		952,635	
		(15,000)				2,573,383				3,955		(3,523)		782,045	
		(7,007)				(32,139)				(2,644)		2,639		738,808	
		1,568,453				1,502,478				1,192		374,204		(4,016)	
		9,491				(789)				1,232,058		190,076		746,412	
		(5,334)				1,092,820				909,614		866		7,316	
		(22,694)				1,851				1,398,609		(3,424)		(6,898)	
		1,547,062				(25,688)				879,037		(1,496)		2,144	
		1,198,619				2,152,623				(6,859)		188,853		1,265,129	
		(22,349)								(25,120)		943,347		1,122,794	
		(24,266)								706,874		(2,469)		734,882	
		1,581,670								(1,264)		376,041			
		13,732								(6,619)		173,952			
										135,979					
2,392,272	1,196	15,822,586	7,911	(1,650)	(1)	20,010,317	10,005	4,864,148	2,432	13,899,875	6,950	5,355,706	2,678	9,844,771	4,922

Footnote: Shipments are originally booked using weights from plant of departure and adjusted in a subsequent month using weights at plant of arrival. Small variations in the weights (both positive and negative) are attributable to this adjustment.

MASS BALANCE SUMMARY FOR BLAST FURNACE CADMIUM DUST

ATTACHMENT 5

ASARCO INC. EAST HELENA PLANT
MASS BALANCE SUMMARY FOR BLAST FURNACE CADMIUM DUST

	Tons	Gold troy oz	Silver troy oz	Lead lb	Copper lb	Arsenic lb	Antimony lb	Bismuth lb	Cadmium lb	Zinc lb
1992 Shipments										
To Japan	413		290	65,639	283				561,583	
To Encycle	766	12.0	5,750	551,038	5,764	26,822	3,646	3,021	219,436	276,692
To El Paso	824	14.4	7,784	509,521	6,942	28,853	3,922	3,250	253,640	297,643
1992 Receipt From Encycle										
1992 Metals Difference with Encycle										
1993 Shipments										
To Japan	55		33	10,884	44				64,617	
To Encycle	786	17.1	5,242	492,217	5,301	22,543	2,690	2,401	292,269	290,408
1993 Receipt From Encycle	468	123.0	4,050	199,704	12,532	7,588	1,109	1,021	19,155	32,879
1993 Metals Difference with Encycle	318	(105.9)	1,192	292,513	(7,231)	14,955	1,581	1,380	273,114	257,529
1994 Shipments To Encycle	1,656	33.8	13,626	989,128	10,705	40,937	6,477	4,603	661,404	588,034
1994 Receipt From Encycle	812	92.8	7,158	519,924	35,951	29,668	4,223	4,572	88,271	138,218
1994 Metals Difference with Encycle	844	(59.0)	6,468	469,204	(25,246)	11,269	2,254	31	573,133	449,816
1995 Shipments To Encycle	83	0.0	571	39,199	496	1,985	331	198	29,936	31,250
1995 Receipt From Encycle										
1995 Metals Difference with Encycle										

Footnote: As Encycle does not add any metals in the processing of the blast furnace cadmium dust, ASARCO attributes any negative values to sampling and analytical errors.

Lot	Received	Dry Weight lb	Au oz/ton	Ag oz/ton	Pb %	Cu %	As %	Sb %	Bi %	Cd %	Zn %	Gold Oz	Silver Oz	Lead Lb.	Copper Lb.	Arsenic Lb.	Antimony Lb.	Bismuth Lb.	Cadmium Lb.	Zinc Lb.
		137,048										0 7	260	58519	665	2876	411	288	8771	9319
590	6/15/93	174,518	0 034	11 49	47 30	0 60	2 00	0 10	0 30	4 00	8 00	3.0	1,003	82,547	1,047	3,490	175	524	6,981	13,961
1053	10/12/93	624,866	0 382	8 92	33.60	6 20	0 70	0 30	0 12	1 95	5 50	119.3	2,787	58,638	10,820	1,222	524	209	3,403	9,598
		936,432										123.0	4,050	199,704	12,532	7,588	1,109	1,021	19,155	32,879
		468																		
91	1/19/94	153,467	0.028	7.95	31.40	3.30	1.50	0.40	0.82	3.10	7.10	2.1	610	54,799	5,759	2,618	698	1,431	5,410	12,391
290	3/15/94	520,590	0 276	7 12	31.80	0 60	1 60	0.20	0.16	12.10	19.80	71.8	1,853	55,497	1,047	2,792	349	279	21,117	34,555
306	3/21/94	144,737	0 082	7 20	32.40	6.10	0 90	0 20	0.14	3.88	7 20	5.9	521	56,544	10,646	1,571	349	244	6,771	12,565
549	5/13/94	306,139	0.026	10.23	40.80	2 20	1 80	0.40	0.33	6.10	6.80	4.0	1,566	71,203	3,839	3,141	698	576	10,646	11,867
709	6/6/94	155,280	0.068	9.39	40 00	3.80	1.40	0.30	0.25	4.40	6.90	5.3	729	69,807	6,632	2,443	524	436	7,679	12,042
712	6/6/94	154,140	0 018	9 96	37 00	2 20	1.60	0 30	0 39	6.40	8.00	1.4	768	64,572	3,839	2,792	524	681	11,169	13,961
854	6/27/94	147,297	0.024	12 06	51.42	1 70	4.30	0 42	0 34	4.80	13.10	1.8	888	89,737	2,967	7,504	733	593	8,377	22,862
1339	10/13/94	41,631	0 020	10 71	33 10	0.70	3.90	0.20	0.19	9.80	10.30	0.4	223	57,765	1,222	6,806	349	332	17,103	17,975
		1,623,281										92.8	7,158	519,924	35,951	29,668	4,223	4,572	88,271	138,218
		812																		
		2,559,713																		
		1,280										215.8	11,208	719,628	48,483	37,256	5,332	5,593	107,426	171,097

SHIPMENTS OF B.H. DUST TO ENCYCLE FOR YEAR 1992 ENCYCLE.XLS

MONTH FRT. PD.	DATE SHIPPED	CAR NUMBER	LOT NUMBER	WET WEIGHT	H2O	DRY WEIGHT	ANALYSIS AU	AG	PB	CU	AS	SB	BI	CD	ZN
	17-Sep	BN577466 ✓	EP-1 ←	189,180	5.5	178,775					2.00	0.25	0.16		20.00
	TOTAL IN TRANSIT 9/31/92			189,180		178,775									
Nov-92	20-Oct	BN561835 ✓	EH-11 ←	196,420	6.1	184,438	0.020	8.08	36.90	0.30	1.60	0.20	0.23	12.60	17.10
Nov-92	20-Oct	DRGW6017 ✓	EH-12 ←	197,820	7.5	182,984	0.020	8.08	36.90	0.30	1.60	0.20	0.23	12.60	17.10
Nov-92	26-Oct	563273 ✓	EH-13 ←	191,400	24.6	144,316	0.020	7.18	37.60	0.40	1.80	0.30	0.21	12.80	17.30
Nov-92	26-Oct	56419 ✓	EH-14	193,880	22.4	150,451	0.020	7.18	37.60	0.40	1.80	0.30	0.21	12.80	17.30
Nov-92	26-Oct	56287 ✓	EH-15	185,040	23.9	140,815	0.000	8.40	40.20	0.40	2.00	0.30	0.24	12.60	16.90
Nov-92	26-Oct	8148 ✓	EH-16 ←	188,460	22.9	145,303	0.000	8.40	40.20	0.40	2.00	0.30	0.24	12.60	16.90
	TOTAL IN TRANSIT 10/31/92			1,342,200		1,127,082									
Dec-92	1-Dec	MP642217 ✓	EH-17	188,120	19.2	152,001	0.026	7.17	32.90	0.40	1.80	0.20	0.18	15.80	18.60
Dec-92	1-Dec	CR576706	EH-18	163,760	21.4	128,715	0.026	7.17	32.90	0.40	1.80	0.20	0.18	15.80	18.60
JAN-93	17-Dec	246674 ✓	EH-19	194,600	23.2	149,453	0.012	6.59	32.00	0.40	1.60	0.20	0.12	18.10	20.50
JAN-93	17-Dec	246512 ✓	EH-20	199,040	22.4	154,455	0.012	6.59	32.00	0.40	1.60	0.20	0.12	18.10	20.50
	TOTAL IN TRANSIT 12/31/92			2,087,720		1,711,706									

	CONTENTS								
LOT NUMBER	AU	AG	PB	CU	AS	SB	BI	CD	ZN
EP-1	1.6	927	55,097	651	3,576	447	286	27,117	35,755
	1.6	927	55,097	651	3,576	447	286	27,117	35,755
EH-11	1.8	745	68,058	553	2,951	369	424	23,239	31,539
EH-12	1.8	739	67,521	549	2,928	366	421	23,056	31,290
EH-13	1.4	518	54,263	577	2,598	433	303	18,472	24,967
EH-14	1.5	540	56,570	602	2,708	451	316	19,258	26,028
EH-15	0.0	591	56,608	563	2,816	422	338	17,743	23,798
EH-16	0.0	610	58,412	581	2,906	436	349	18,308	24,556
	8.1	4,670	416,529	4,076	20,483	2,924	2,437	147,193	197,933
EH-17	2.0	545	50,008	608	2,736	304	274	24,016	28,272
EH-18	1.7	461	42,347	515	2,317	257	232	20,337	23,941
EH-19	0.9	492	47,825	598	2,391	299	179	27,051	30,638
EH-20	0.9	509	49,426	618	2,471	309	185	27,956	31,663
	13.6	6,677	606,135	6,415	30,398	4,093	3,307	246,553	312,447

1993

ENDOWN93.XLS

BAGHOUSE DUST SHIPPED TO ENCYCLE FROM EAST HELENA INVENTORY (SHIPPED 1993)

MONTH FRT. PD.	DATE SHIPPED	CAR NUMBER	LOT NUMBER	WET WEIGHT	H2O	DRY WEIGHT	ANALYSIS AU	AG	PB	CU	AS	SB	BI	CD	ZN
Mar-93	2/20/93	BN 556678	EH-1	180,100	17.4	148,763	0.000	6.00	32.70	0.30	1.70	0.20	0.15	16.90	20.10
Mar-93	2/20/93	DRGW 6017	EH-2	188,700	16.2	158,131	0.000	6.00	32.70	0.30	1.70	0.20	0.15	16.90	20.10
********	2/26/93	BN 561607	EP-1	161,320	11.3	143,091					2.00	0.25	0.16		20.00
May-93	4/29/93	ATW 12002	EH-3	164,440	20.7	130,401	0.026	8.06	37.50	0.40	1.70	0.20	0.18	10.80	16.80
May-93	4/29/93	ATW 12001	EH-4	163,340	22.8	126,098	0.022	7.90	38.00	0.40	1.60	0.10	0.10	11.80	17.10
********	4/30/93	ATW 12004	EP-2	174,080	0.9	172,513					2.00	0.25	0.16		20.00
********	4/30/93	ATW 12003	EP-3	176,380	0.4	175,674					2.00	0.25	0.16		20.00
********	8/20/93	ATW 12008	EP-4	186,800	8.0	171,856					2.00	0.25	0.16		20.00
********	8/23/93	ATW 12003	EP-5	186,660	8.0	171,727					2.00	0.25	0.16		20.00
********	10/15/93	ATW 12003	EP-6	169,020	8.0	155,498					2.00	0.25	0.16		20.00
Jan-94	11/24/93	ATW 12006	EH-5	185,180	5.6	174,810	0.074	7.43	28.60	0.40	1.20	0.20	0.17	21.50	17.70
Jan-94	11/24/93	ATW 12001	EH-6 ←	182,940	10.2	164,280	0.074	7.43	28.60	0.40	1.20	0.20	0.17	21.50	17.70
Jan-94	12/9/93	ATW 12005	EH-7 ✓	181,760	8.7	165,947	0.000	7.00	29.20	0.30	1.50	0.10	0.15	21.20	17.60
Jan-94	12/16/93	ATW 12007	EH-8 ✓	184,640	10.9	164,514	0.000	7.00	29.20	0.30	1.50	0.10	0.15	21.20	17.60
Jan 94	12/17/93	ATW 12002	EH-9 ✓	182,420	10.1	163,996	0.008	6.08	28.40	0.40	1.30	0.20	0.16	21.40	18.40
Jan 94	12/30/93	BN 563363	EH-10 ✓	181,700	3.3	175,704	0.008	4.36	31.30	0.20	1.10	0.20	0.14	19.00	21.00
				2,849,480		2,563,003									

BAGHOUSE DUST SHIPPED TO ENCYCLE FROM EAST HELENA INVENTORY

LOT NUMBER	CONTENTS AU	AG	PB	CU	AS	SB	BI	CD	ZN
EH-1	0.0	446	48,646	446	2,529	298	223	25,141	29,901
EH-2	0.0	474	51,709	474	2,688	316	237	26,724	31,784
EP-1	1.1	585	38,872	500	2,862	358	229	30,870	28,618
EH-3	1.7	526	48,900	522	2,217	261	235	14,083	21,907
EH-4	1.4	498	47,917	504	2,018	126	126	14,880	21,563
EP-2	1.5	788	53,165	761	3,450	431	276	27,062	34,503
EP-3	1.4	789	53,166	761	3,513	439	281	27,062	35,135
EP-4	1.5	757	53035	808	3,437	430	275	26,758	34,371
EP-5	1.6	777	53,354	786	3,435	429	275	26,662	34,345
EP-6	1.7	776	49,265	624	3,110	389	249	23,603	31,100
EH-5	6.5	649	49,996	699	2,098	350	297	37,584	30,941
EH-6	6.1	610	46,984	657	1,971	329	279	35,320	29,078
EH-7	0.0	581	48,457	498	2,489	166	249	35,181	29,207
EH-8	0.0	576	48,038	494	2,468	165	247	34,877	28,954
EH-9	0.7	499	46,575	656	2,132	328	262	35,095	30,175
EH-10	0.7	383	54,995	351	1,933	351	246	33,384	36,898
	25.9	9,714	793,074	9,541	42,350	5,166	3,986	454,286	488,480

AS OF 12-31-94

BAGHOUSE DUST SHIPPED TO ENCYCLE FROM EAST HELENA INVENTORY (SHIPPED 1994)

MONTH FRT. PD.	DATE SHIPPED	CAR NUMBER	LOT NUMBER	WET WEIGHT	H2O	DRY WEIGHT	ANALYSIS AU	AG	PB	CU	AS	SB	BI	CD	ZN
Feb-94	1/6/94	ATW 12004	EH-1	178,980	10.0	161,082	0.030	7.97	28.00	0.30	1.30	0.02	0.16	20.30	17.80
Feb-94	1/7/94	ATW 12008	EH-2	175,280	10.4	157,051	0.028	7.47	28.20	0.30	1.30	0.30	0.19	21.20	16.50
Feb-94	1/21/94	EJE 87762	EH-3	147,280	8.7	134,467	0.012	7.99	31.9	0.3	1.50	0.20	0.15	19.4	19.50
Feb-94	1/21/94	LT 8216	EH-4	151,180	14.5	129,259	0.008	6.79	30.80	0.30	1.40	0.20	0.15	19.00	18.30
Mar-94	2/11/94	ATW 12006	EH-5	174,700	6.9	162,646		9.50	29.60	0.40	1.80	0.20	0.11	21.80	16.70
Mar-94	2/1/94	CR 577763	EH-6	148,020	5.8	139,435	0.026	9.68	28.90	0.40	1.60	0.20	0.15	19.90	16.60
Mar-94	2/1/94	SP 323231	EH-7	176,680	13.3	153,182	0.018	9.07	28.80	0.40	1.60	0.10	0.12	20.40	17.90
Mar-94	2/4/94	DRGW 56309	EH-8	180,860	12.3	158,614	0.016	8.84	27.50	0.40	1.80	0.20	0.14	20.80	16.20
Mar-94	2/4/94	BN 561878	EH-9	162,420	6.5	151,863	0.014	8.63	27.90	0.40	1.70	0.40	0.10	20.80	15.90
Mar-94	2/25/94	ATW 12001	EH-10	178,680	3.5	172,426	0.080	7.96	28.60	0.40	1.50	0.20	0.11	20.90	16.90
Apr-94	3/18/94	CR 582346	EH-11	177,340	8.2	162,798	0.018	8.82	30.10	0.30	1.80	0.10	0.17	21.10	17.60
Apr-94	3/18/94	CR 581761	EH-12	175,940	16.1	147,614	0.010	7.96	30.40	0.30	2.00	0.20	0.12	21.50	17.50
Apr-94	3/18/94	CR 577296	EH-13	162,060	9.2	147,150	0.016	8.73	30.80	0.30	1.60	0.20	0.12	21.50	17.50
Apr-94	3/25/94	BN 561797	EH-14	188,960	6.1	177,433	0.012	8.59	30.90	0.30	1.00	0.20	0.14	18.00	18.70
Apr-94	3/25/94	DRGW 6011	EH-15	182,920	7.9	168,469	0.024	10.88	30.10	0.30	0.80	0.20	0.13	19.90	18.10
Apr-94	3/25/94	BN 556696	EH-16	167,460	8.3	153,561		8.80	30.60	0.30	1.20	0.20	0.14	20.80	17.70
Jun-94	4/8/94	ATW 12002	EH-17	181,320	6.7	169,172	0.022	6.78	30.90	0.30	0.50	0.20	0.14	18.50	18.70
Jun-94	5/4/94	MKT16120	EH-18	170,660	9.9	153,765	0.020	7.38	30.60	0.30	0.60	0.20	0.15	18.60	18.90
Jun-94	5/6/94	CS560881	EH-19	189,100	7.3	175,296	0.008	6.89	32.20	0.30	0.40	0.20	0.15	17.10	18.10
May-94	5/10/94	BN556683	EH-20	179,140	7.2	166,242	0.020	7.30	30.00	0.20	0.80	0.20	0.14	19.40	18.90
May-94	5/12/94	BN563162	EH-21	182,040	6.7	169,843	0.036	6.86	30.50	0.30	0.20	0.20	0.14	19.10	18.80
Aug-94	7/20/94	ATW 12008	EP-6	188,560	3.7	181,583	0.022	9.96	31.58	0.40	0.50	0.20	0.14	15.13	18.50
Aug-94	7/28/94	ATW 12005	EP-7	189,040	3.3	182,802	0.022	9.96	31.58	0.40	0.50	0.20	0.14	15.13	18.50
				4,008,620		**3,675,753**									

1837.5765

BAGHOUSE DUST SHIPPED TO ENCYCLE FROM EAST HELENA INVENTORY

LOT NUMBER	CONTENTS AU	AG	PB	CU	AS	SB	BI	CD	ZN
EH-1	2.4	642	45,103	483	2,094	32	258	32,700	28,673
EH-2	2.2	587	44,288	471	2,042	471	298	33,295	25,913
EH-3	0.8	537	42,895	403	2,017	269	202	26,087	26,221
EH-4	0.5	439	39,812	388	1,810	259	194	24,559	23,654
EH-5		773	48,143	651	2,928	325	179	35,457	27,162
EH-6	1.8	675	40,297	558	2,231	279	209	27,748	23,146
EH-7	1.4	695	44,116	613	2,451	153	184	31,249	27,420
EH-8	1.3	701	43,619	634	2,855	317	222	32,992	25,695
EH-9	1.1	655	42,370	607	2,582	607	152	31,588	24,146
EH-10	6.9	686	49,314	690	2,586	345	190	36,037	29,140
EH-11	1.5	718	49,002	488	2,930	163	277	34,350	28,652
EH-12	0.7	588	44,875	443	2,952	295	177	31,737	25,832
EH-13	1.2	642	45,322	441	2,354	294	177	31,637	25,751
EH-14	1.1	762	54,827	532	1,774	355	248	31,938	33,180
EH-15	2.0	916	50,709	505	1,348	337	219	33,525	30,493
EH-16		676	46,990	461	1,843	307	215	31,941	27,180
EH-17	1.9	573	52,274	508	846	338	237	31,297	31,635
EH-18	1.5	567	47,052	461	923	308	231	28,600	29,062
EH-19	0.7	604	56,445	526	701	351	263	29,976	31,729
EH-20	1.7	607	49,873	332	1,330	332	233	32,251	31,420
EH-21	3.1	583	51,802	510	340	340	238	32,440	31,930
EP-6	2.0	904	57,344	726	908	363	254	27,474	33,593
EP-7	2.0	910	57,729	731	914	366	256	27,658	33,818
	37.8	15,440	1,104,201	12,162	42,759	7,206	5,113	716,536	655,445

GREG L:NS.C

BAGHOUSE DUST SHIPPED TO ENCYCLE FROM EAST HELENA INVENTORY (SHIPPED 1995)

BAGHOUSE DUST SHIPPED TO ENCYCLE FROM EAST HELENA INVENTORY

MONTH FRT. PD.	DATE SHIPPED	CAR NUMBER	LOT NUMBER	WET WEIGHT	H2O	DRY WEIGHT	ANALYSIS AU	AG	PB	CU	AS	SB	BI	CD	ZN	CONTENTS AU	AG	PB	CU	AS	SB	BI	CD	ZN
Jan-00	6/5/95	12008	EH-1	176,140	6.1	165,395	0.000	6.90	23.70	0.30	1.20	0.20	0.12	18.10	18.90	0.0	571	39,199	496	1,985	331	198	29,936	31,260
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
Jan-00	1/0/00	0	0	0	0.0	0	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0	0	0	0
			TOTALS	176,140		165,395										0.0	571	39,199	496	1,985	331	198	29,936	31,260

METALLURGICAL PROFILES, SOURCES, AND AMOUNTS OF VIRGIN ORE FEEDSTOCKS FOR 1995

ATTACHMENT 6

ASARCO INC EAST HELENA PLANT

VIRGIN ORE FEED STOCKS RECEIVED IN 1995

AVERAGE ASSAYS

SOURCE	Total Tons	O/T Au	O/T Ag	%Pb	%Cu	%SiO2	%Fe	%CaO	%Zn	%S	%As	%Sb	%Bi	%Sn	%Cd
Mt. Tunnels	16,621	3.10	37.29	50.70	0.89	3.80	12.70	0.70	8.28	21.65	0.10	0.10	0.05	0.01	0.03
Lucky Friday	26,203	0.03	59.99	60.00	0.66	3.90	4.80	0.20	8.11	15.11	0.13	0.62	0.01	0.02	0.06
Leadville	7,584	0.97	37.89	65.00	1.78	4.00	7.70	0.40	3.77	17.35	0.10	0.12	0.09	0.01	0.03
Leadville Pyrite	722	0.43	0.95	0.67	0.10	5.10	53.30	1.50	1.70	24.21	0.11	0.01	0.02	0.02	
Julcani	8,428	1.19	219.36	28.06	7.00	5.00	15.50	0.26	7.04	27.70	1.10	2.30	0.60	0.01	0.07
Uchucchacua	7,141	0.05	261.87	18.70	0.48	4.52	18.79	1.45	10.23	29.20	2.12	1.30	0.02	0.05	0.06
Carolina	8,721	0.36	246.00	27.37	2.77	9.57	22.30	0.62	6.05	29.16	0.88	2.81	0.61	0.04	0.05
Quiruvilca	11,716	0.07	118.47	60.00	2.63	1.53	7.10	0.04	4.32	18.56	1.25	3.40	0.14	0.02	0.14
Arcata Minas	5,016	1.43	393.96	8.51	1.60	30.67	7.50	2.03	10.99	25.02	0.60	0.64	0.01	0.02	0.04
Orcopampa	3,064	2.53	194.67	6.02	4.33	9.55	28.10	0.35	7.37	35.66	0.40	1.43	0.04	0.01	0.12
Yauli-50	2,450	0.05	55.00	48.00	1.20	10.00	8.00	0.00	4.50	15.00	1.20	0.20	0.50	0.00	
Bolivian Pb	2,359	0.02	229.30	26.13	2.04	9.00	11.50	0.20	8.74	26.37	1.22	2.44	0.13	1.21	0.13
NorPeru Cu/Ag	5,302	0.11	497.12	7.90	16.53	7.80	5.20	0.40	13.03	30.30	3.30	7.35	0.11	0.50	0.14
McCoy Cove	3,563	0.44	118.09	36.83	0.69	8.50	6.10	0.50	13.91	24.71	0.35	0.37	0.02	0.23	0.20
Peru - 31	2,385	0.52	133.76	35.00	0.97	4.00	10.20	0.30	9.21	26.75	0.19	0.27	0.04	0.01	0.04
Minpeco - 89	4,279	0.18	138.44	46.00	2.03	5.10	9.80	0.40	5.24	23.67	0.80	1.30	0.52	0.10	0.04
Peru -33	1,321	0.11	75.00	45.00	2.50	4.30	3.20	1.10	3.50	22.00	0.50	0.50	0.98	0.10	0.04
Transmine Bol. Ag	387	0.01	621.19	5.45	1.39	9.61	7.49	0.08	11.20	24.52	0.72	4.56	0.08	2.66	0.12
Peru - 88	94	0.11	75.00	45.00	2.50	4.30	3.20	1.10	3.50	22.00	0.50	0.50	0.98	0.10	
Lambol	41		1000.00	15.00		5.00	2.00	0.20	8.25	20.00	2.00	3.80	0.10	1.00	0.09
Atacocha	1,859	0.15	56.47	67.80	1.00	6.60	3.00	1.40	2.80	15.40	0.39	0.65	0.24	0.04	0.03
Sweetwater Lead	1,895	0.02	1.10	77.41	0.64	1.00	1.00	2.00	1.44	12.87	0.10	0.10	0.00	0.03	0.02
Peru-41	1,882	0.10	85.00	35.00	0.50	2.50	9.00	0.50	7.50	20.00	0.10	0.10	0.05	0.00	0.03
Trafigura Ag Ore - 93	897	0.00	700.00	5.00	1.50	15.00	1.79	0.23	10.00	15.00	0.57	3.75	0.04	0.00	0.14
Trafigura Ag. 37 47	112	0.02	1059.10	9.88	0.79	23.34	2.67	0.19	12.86	30.90	0.42	19.50	0.05	1.28	0.14
Hidromet	502	0.50	100.00	42.80	1.10	5.60	5.80			7.70	2.00	0.67	0.50		0.09
Mexican Ag	2,580		105.00	62.00	2.00	3.10	2.30	0.20	3.40	19.35	0.70	0.40	0.05	0.10	0.04
Elura	7,492	0.03	15.20	49.00	0.40	5.00	3.00	0.20	4.70	18.70	0.40	0.15	0.00	0.01	0.01
Sogem Brazilian	245	1.06	616.88	5.17	0.41	4.60	1.30	0.20	25.35	59.42	0.06	0.24	0.04	0.02	0.19
Great Western	676	0.02	17.59	57.14	0.30	12.87	3.00	0.23	2.99	10.87	0.00	0.20	0.01	0.02	0.01
Volcan/Huaron	358	0.90	90.00	50.00	2.50	3.00	7.00	0.30	6.00	22.50	0.80	0.75	0.08	0.01	0.03
Sunshine Lead Conc.	500	0.03	107.69	45.55	1.50	4.00	10.00	0.30	0.76	24.25	0.80	1.30	0.02	0.01	0.01
Sunshine Ag Conc.	1,573	0.06	1000.00	8.00	17.23		17.00		2.24	24.50	0.79	0.79	0.10	0.00	0.01

ASARCO INC EAST HELENA PLANT

VIRGIN ORE FEED STOCKS RECEIVED IN 1995

SOURCE	Total Tons	AVERAGE ASSAYS													
		O/T Au	O/T Ag	%Pb	%Cu	%SIO2	%Fe	%CaO	%Zn	%S	%As	%Sb	%Bi	%Sn	%Cd
Barex	42		1000.00	8.00					9.00		0.50	7.00	0.10	1.50	0.09
Vancouver Wharves	51	0.19	113.37	26.36	3.43	6.10	8.70		13.60	23.70	0.90	0.90	0.12	0.07	0.09
Bolivian Zore -44	690		84.60	25.00							0.10	0.65	0.00	0.05	0.12
Bolivian -42	605	0.01	102.10	20.00	0.30		7.00	0.30	13.00	25.00	0.20	5.00	0.10	0.00	
Mintrade	132		84.60	25.00							0.10	0.65	0.00	0.05	0.11
Yauli-43	873	0.06	155.00	50.00	2.00	10.60	10.00	0.70	4.50	30.18	1.80	0.60	1.00	0.04	0.02
Atron	246	0.01	35.00	52.50							0.66	0.75	0.39	0.00	0.04
Gale Williams	96	0.01	102.10	20.00	0.30		7.00	0.30	13.00	25.00	0.20	5.00	0.10	0.00	0.09
Nelson Salvage	33	1.62	1.17	0.30	0.30	43.20	16.00	2.40	0.75	7.00	0.00	0.00	0.03		0.02
Owl Concentrates	5	12.32	3.27	0.40	0.23	46.10	16.30		0.60	0.27		0.10	0.04	0.04	0.01
Pegasus Pyrite	67	3.61	86.22	0.58	0.88	1.64	0.17	0.54	2.11	0.01	0.02	0.08			0.01
Silver State	54	0.30	54.00	2.80	0.10	52.40	0.40	0.30	5.10	3.10	0.10	0.40	0.03		0.03
ECS Refining Ore	90	0.20	0.09	0.59	1.09				1.20	0.41		0.12			0.01
Mine Systems	11	2.00	1.20	0.40						0.20	0.20	0.20			0.01
Golden Wonder	3	4.57	5.41	1.27	0.20	39.00			0.20	6.52	0.20	0.15	0.05		0.02
Warren Development	11	145.00	45.00	2.45	0.10				0.20	7.50	1.20	0.00	0.04		0.01
Arizona Mining	8	0.75	2.60	0.10						0.70	0.10	0.70		0.53	
Kendall Carbon	24	3.22	0.87	0.10					0.40						0.01
McCoy Carbon	7	7.81	202.32						2.20						0.06
Geneva Carbon	3	73.36	70.07	0.50	0.10				0.06			0.02	0.01		0.01
Homestake Carbon	20	8.00	11.43	0.10	0.10										0.01
Degerstrom Carbon	30	6.71	4.71	0.10					0.20						0.01
Metals Research Carbon	212	3.01	36.40	0.10					1.00				0.03		0.04
Nevada Gold Carbon	12	2.45	1.58	0.20					0.10				0.03		0.01
Brandeis Carbon	266	27.74	6.25	0.28	0.28				1.00	0.00	0.19	0.06	0.03		0.02
Round Mountain Carbon	180	13.88	15.41	0.10							0.10				
Westex Gold Carbon	1	57.79	0.85	0.37	0.16				0.09						0.14
Zortman Mining Carbon	15	4.43	34.15	0.10											
Total	141,756														

Note that Asarco receives some primary materials that are not virgin which are not listed in this table or in the table submitted in Asarco's December 5th response.

DESIRED OPERATING CONDITIONS FOR THE BLAST FURNACE

ATTACHMENT 7

ASARCO INC. EAST HELENA PLANT
DESIRED OPERATING CONDITIONS FOR THE BLAST FURNACE
(SPECIFICATIONS FOR SMOOTH OPERATIONS)

		Minimum Range	Maximum Range
Temperature (Furnace Top)		100 Degrees F	1000 Degrees F
Coke		1750 lb/charge	1900 lb/charge
Tuyere Air Pressure		25 oz. Water	74 oz. Water
Metals			
Gold	Ozs.	*	*
Silver	Ozs.	*	*
Lead	%	18%	36%
Copper	%	0%	4%
Silica	%	12%	13%
Sulfur	%	0%	3%
Sulfate	%	0%	2%
Iron	%	10%	12%
Lime	%	9%	11%
Arsenic	%	0%	3%
Antimony	%	0%	3%
Tin	%	0%	<.5 %
Tellurium	%	0%	<.5 %
Bismuth	%	0%	<.5 %
Cadmium	%	0%	<.5 %

* Minimum and Maximum ranges for precious metals are not a driving force in blast furnace criteria

Sinter Constituents:

Porosity	20%	40%
Size	+ 1/4"	+ 8"